

## PATENT ABSTRACTS OF JAPAN

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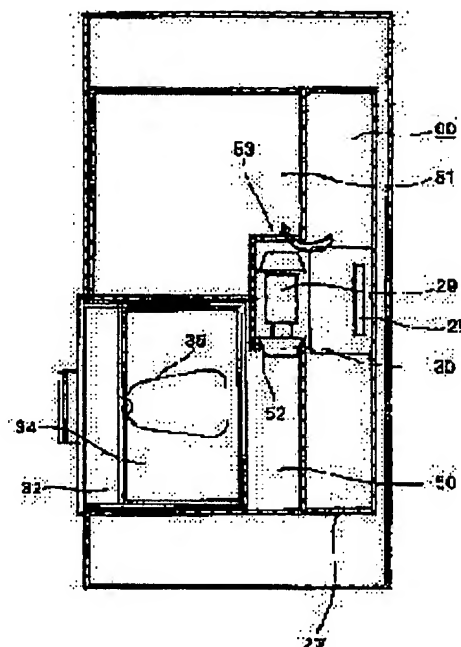
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## (54) DRYING MACHINE FOR CLOTHING

## (57)Abstract:

PROBLEM TO BE SOLVED: To shorten a drying time in a drying machine for clothing, and dry the clothing with the crisp finished feeling.

SOLUTION: A drying machine for clothing, a comprises a drying chamber for accommodating the clothing, and a circulation air flow passage 6 for circulating air for drying the clothing, a lamp or a heater for heating the air for drying, and drying the clothing, is installed in the drying chamber, the circulation air flow passage 6 is branched into the first and second air flow passages 51, 50 arranged in parallel with each other, and a moisture absorbent 34 is installed on the second air flow passage 50.



## LEGAL STATUS

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## CLAIMS

[Claim(s)]

[Claim 1] The clothes dryer which is a clothes dryer which equips the drying room which contains clothing, and its drying room with the circulation air course which circulates the wind for clothing desiccation, and is characterized by coming to have the lamp or heater for drying said clothing while heating the wind for said desiccation in said drying room.

[Claim 2] The clothes dryer according to claim 1 characterized by coming to attach said lamp or heater in the inner surface of the front lid of said drying room.

[Claim 3] The clothes dryer according to claim 1 characterized by coming to consider the inner surface of said drying room as a reflector configuration.

[Claim 4] The clothes dryer characterized by being the clothes dryer which equips the drying room which contains clothing, and its drying room with the circulation air course which circulates the wind for clothing desiccation, consisting of the 1st and the 2nd air course which said circulation air course branches and are arranged at juxtaposition, and coming to prepare a desiccant in said 2nd air course.

[Claim 5] While being the clothes dryer which equips the drying room which contains clothing, and its drying room with the circulation air course which circulates the wind for clothing desiccation and heating the wind for said desiccation in said drying room The clothes dryer characterized by having the lamp or heater for drying said clothing, and consisting of the 1st and the 2nd air course which said circulation air course branches and are arranged at juxtaposition, and coming to prepare a desiccant in said 2nd air course.

[Claim 6] The clothes dryer according to claim 4 or 5 which said desiccant pulls out and it comes to prepare inside possible [ ejection ].

[Claim 7] The clothes dryer characterized by coming to prepare said 1st [ the ] and the air course change device in which the change of the 2nd air course is performed in a clothes dryer according to claim 4 or 5 corresponding to the detection humidity of a humidity sensor and its humidity sensor.

[Translation done.]

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## DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to amelioration of desiccation actuation of a clothes dryer.

[0002]

[Description of the Prior Art] Carry out heat exchange to the air which introduced the heating wind in the clothes dryer in the drying room which consists of a rotating drum etc., and introduced from the outside the heating wind which was made to absorb the moisture of clothing in the style of heating, and absorbed the moisture, cool, make the condensation operation accompanying cooling remove moisture, and this discharges, and the air from which moisture was removed heats again, it sends in in drying room, and it is dry in clothing.

[0003]

[Problem(s) to be Solved by the Invention] However, in the present clothes dryer, there is a fundamental problem that the result condition of desiccation that the drying time starts for a long time does not serve as PARITSU, and this problem will become remarkable in a mass clothes dryer especially. It is thought that the above-mentioned problem originates in performing desiccation only by dehumidification from the clothing by circulation of the heating style.

[0004] For example, although it is possible to use a mass thing as a heating heater formed in a circulation air course in order to shorten the drying time, there is an insurance upper limit community in it.

[0005] Moreover, by the circulation wind which is not an elevated temperature so much, the result made into PARITSU is never expectable, and in the phase which progressed to some extent, especially the dehumidification by the heat exchange of the circulation style seldom progresses, but is considered to be the cause which bars the result which also made this PARITSU.

[0006] It is what performed this invention in view of the above-mentioned situation, and shortening of the drying time in a clothes dryer is attained, and it aims at the ability to be made to perform a result of desiccation with PARITSU as good further.

[0007] Moreover, it aims at offering the mass clothes dryer which is excellent in drying ability.

[0008]

[Means for Solving the Problem] Invention of this invention according to claim 1 is the clothes dryer which equips the drying room which contains clothing, and its drying room with the circulation air course which circulates the wind for clothing desiccation, and it is taken as the configuration for which it comes to prepare the lamp or heater for drying said clothing while it heats the wind for said desiccation in said drying room.

[0009] According to the above-mentioned configuration, in the style of circulation, in addition, since desiccation of clothing is performed by the exposure heat at a lamp or a heater, while desiccation capacity improves by this and the drying time is shortened, the result condition of the desiccation made into PARITSU is acquired.

[0010] In invention according to claim 1, where a front lid is opened by considering as the configuration (invention according to claim 2) with which a lamp or a heater is attached in the inner surface of the front lid of drying room, since a lamp or a heater is located outside drying room, it can be performed easily, without receipts and payments of the clothing to drying room becoming obstructive [ a lamp or a heater ].

[0011] In invention according to claim 1, drying ability improves further by (invention according to claim 3) being reflected by the inner surface of drying room being considered as a reflector configuration, and exposure light being reflected in the reflector, and attaining to clothing.

[0012] Invention according to claim 4 is a clothes dryer which equips the drying room which contains clothing, and its drying room with the circulation air course which circulates the wind for clothing desiccation, consists of the 1st and the 2nd air course which said circulation air course branches and are arranged at juxtaposition, and is taken as the configuration in which it comes to prepare a desiccant in said 2nd air course.

[0013] According to the above-mentioned configuration, a desiccant is enabled to perform chemical desiccation of the circulation style auxiliary, the dehumidification engine performance depended in the style of circulation by this improves, and the result condition of the desiccation made into PARITSU is acquired.

[0014] Invention according to claim 5 has the configuration of invention of claim 1 and four publications, and doubles and demonstrates claim 1 and the operation effectiveness of invention of four publications.

[0015] In invention according to claim 4 or 5, a desiccant pulls out and always good hygroscopic ability can be given by taking out a desiccant and making it dry by considering as the configuration (invention according to claim 6) which it comes to prepare inside possible [ ejection ].

[0016] In a clothes dryer according to claim 4 or 5, a desiccant can be efficiently used by changing to a 1st air course side in the phase where the dehumidification capacity of the circulation style by (invention according to claim 7) and heat exchange declines, by establishing the 1st and the air course change device in which the change of the 2nd air course is performed, corresponding to the detection humidity of a humidity sensor and its humidity sensor.

[0017]

[Embodiment of the Invention] Drawing 1 shows the longitudinal-section configuration in the condition of having removed the front lid of a clothes dryer, and drawing 2 shows the appearance configuration in the condition of having pulled out the aperture drawer for the front lid.

[0018] As for 1, the desiccation drum 15 as drying room is formed in the interior with the device frame. The desiccation drum 15 is a product made from stainless steel, and makes the inner surface the reflector.

[0019] Moreover, the desiccation drum 15 is attached in a pivot 14 pivotable at the back, and the heat exchange fan 17 is further formed pivotable behind the desiccation drum 15 at the above-mentioned pivot 14. 40 — a motor — it is — belts 20 and 19 — each — minding — the above-mentioned desiccation drum 15 and the heat exchange fan 17 — it is prepared so that it may be alike, respectively and revolution driving force may be given.

[0020] 5 is attached in the device frame 1 free [ closing motion ], in the clothing receipts-and-payments opening 4 of the desiccation drum 15, it is a lid before a wrap, and the transparent and circular view port 37 is formed in the center section, and the infrared lamp 9 is attached in the center of an inner surface in the condition of being covered with the transparence covering 10. This infrared lamp 9 is a heater heated by radiation. 36 is a control panel.

[0021] The desiccation drum 15 equips a tooth-back location with a through-hole, and the tooth-back space of the desiccation drum 15 which is open for free passage in the desiccation drum 15 with the through-hole, i.e., the heat exchange fan's 17 front space, and the lower part before the desiccation drum 15 are connected by the circulation air course 60 which bypasses the desiccation drum 15 to a lower part side. The both-sides section of the circulation air course 60 consists of connection air courses 24 and 25 located perpendicularly, a drain hole 28 is formed in the lower part of a location to which the connection air course 24 of the back is connected, and the humidity sensor 26 is formed in the slant top location.

[0022] And as shown in drawing 3, the parallel arrangement of the part (downstream of the desiccation style) located in a front [ humidity sensor / 26 / of the circulation air course 60 ] side is branched and carried out to the 1st and the 2nd air course 51 and 50. 29 is a solenoid coil, 30 is solenoid agonist, the solenoid agonist 30 is usually the spring force, and as shown in drawing 3, an air hole 53 is closed by operating with closing and a solenoid coil 29 and carrying out the variation rate of the air hole 52. Thus, the air from a desiccation drum 15 tooth-back side is selectively introduced into the 1st and the 2nd air course 51 and 50 by the air course change device which consists of a solenoid coil 29 and solenoid agonist 30 being established.

[0023] In the 2nd air course 50 of the above, a drawer 32 is formed possible [ receipts and payments ] in the front face of a clothes dryer, the shelf 33 of permeability is formed in the drawer 32 at a dip condition, on the shelf 33, press support of the spring 35 is carried out, and the desiccant 34 of the gestalt with which silica gel, a poly vinyl system water-absorbing resin, etc. were filled up into the permeability bag etc. is formed.

[0024] Chemical dehumidification of the air drawn in the 2nd air course 50 is carried out by passing through the inside of a desiccant 34 by such configuration. Moreover, a desiccant 34 can be taken out by pulling out and pulling out 32, and it can maintain so that hygroscopic, always high ability can be demonstrated by what is considered as dryness in advance of the activity. Furthermore, since it is not vertical and the desiccant 34 is arranged in the dip condition with the shelf 33, moisture absorption area can be made large and the moisture absorption effectiveness can be heightened in the limited air course tooth space. Both the front end sides of the 1st and the 2nd air course 51 and 50 join the connection air course 25 of anterior part.

[0025] Hereafter, explanation of desiccation actuation is given. Drawing 4 is a flow chart which shows the outline of desiccation actuation.

[0026] First, the desiccant 34 in a drawer 32 is put in in the desiccation drum 15 without ejection and clothing, a start switch is turned on with a control panel 36, and desiccation actuation of a desiccant 34 is performed in advance of clothing desiccation. When a desiccant 34 is beforehand made into dryness and is contained in the drawer 32, this desiccation actuation is not needed.

[0027] While a motor 40 operates by a start switch being turned on, an infrared lamp 9 is turned on. While the air for desiccation circulates through the circulation air course 60 in the desiccation drum 15 which both the desiccation drum 15 and the heat exchange fan 17 rotate, and rotates by this, a circulation wind is heated by the infrared lamp 9.

[0028] Heat exchange of the circulation wind is carried out to the open air which circulates through the heat exchange fan's 17 outside location in the heat exchange fan's 17 front location, dehumidification is performed by condensation operation by being cooled by that cause, and the waterdrop by the dehumidification to produce is discharged from a drain hole 28. And the dried circulation wind is that the solenoid coil 29 is not operating, goes into the 1st path 51 from a through-hole 53, and reaches the connection air course 25 further.

[0029] thus, desiccation of the clothing which was heated in the desiccation drum 15 and which is twisted in the style of circulation is performed — both, further, also by the exposure heat of an infrared lamp 9, desiccation of clothing is performed and, thereby, drying ability higher than the clothes dryer of the conventional chisel of the circulation style is demonstrated. Drying ability is improving further by desiccation being performed by the inner surface of the desiccation drum 15 being especially made into a reflector by the reflected heat from the reflector.

[0030] It may replace with the above-mentioned infrared lamp 9, and a halogen lamp may be used, and various heaters may be used.

[0031] And desiccation operation stops in the phase in which the humidity level detected with a humidity sensor 26 reached the set point. Then, an operator contains a desiccant 34 in ejection and a drawer 32 from the inside of the desiccation drum 15, in the desiccation drum 15, contains clothing and turns on a start switch. Thereby, the same desiccation actuation as the above is performed. The condition of internal clothing can be checked through a view port 37.

[0032] and in the condition from which the detection humidity by the humidity sensor 26 became about 1 law, i.e., the phase where the dehumidification by a certain heat exchange of the circulation style would progress, and desiccation of the clothing which the humidity level of the circulation style becomes fixed, and is twisted in the style of circulation will not progress, a solenoid coil 29 is turned on and the solenoid agonist 30 operates — having — a through-hole 52 — open — he and a through-hole 53 are closed. Thereby, a circulation wind is introduced into the 2nd air course 50 side, and chemical dehumidification according [ a circulation wind ] to a desiccant 34 is performed. Desiccation of clothing progresses further more in the style of circulation, and desiccation actuation is suspended in the condition that the humidity corresponding to 95% of dryness factors in this 1st air course 50 was detected by the humidity sensor 26.

[0033] According to the above-mentioned desiccation actuation, first, since direct clothing is dried with the exposure heat of an infrared lamp 9, the desiccation result condition which the drying time was shortened and was made into PARITSU is acquired. Furthermore, the desiccation result condition made into PARITSU is further acquired by using dehumidification by the desiccant 34 auxiliary.

[0034] In the above-mentioned operation gestalt, although the circulation wind considered as the configuration heated only with an infrared lamp 9, the heating is good also as a configuration which forms a heater in a circulation air course like before as an auxiliary thing.

[0035] Moreover, although the graphic display is omitted, a clothes dryer is equipped with the control section which consists of a microcomputer, the signal from a control panel 36 and humidity sensor 26 grade is given to the control section, and a control

section gives an operating-command signal to a motor 60 and halogen lamp 9 grade based on the program set up corresponding to these signals.

[0036]

[Effect of the Invention] According to this invention, shortening of the drying time is attained in a clothes dryer, and it still enables a result of desiccation to be able to be made to do with PARITSU as good.

[0037] The mass clothes dryer which is excellent in drying ability especially can be offered now.

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TECHNICAL FIELD

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[Field of the Invention] This invention relates to amelioration of desiccation actuation of a clothes dryer.

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PRIOR ART

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[Description of the Prior Art] Carry out heat exchange to the air which introduced the heating wind in the clothes dryer in the drying room which consists of a rotating drum etc., and introduced from the outside the heating wind which was made to absorb the moisture of clothing in the style of heating, and absorbed the moisture, cool, make the condensation operation accompanying cooling remove moisture, and this discharges, and the air from which moisture was removed heats again, it sends in in drying room, and it is dry in clothing.

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EFFECT OF THE INVENTION

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TECHNICAL PROBLEM  
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[Problem(s) to be Solved by the Invention] However, in the present clothes dryer, there is a fundamental problem that the result condition of desiccation that the drying time starts for a long time does not serve as PARITSU, and this problem will become remarkable in a mass clothes dryer especially. It is thought that the above-mentioned problem originates in performing desiccation only by dehumidification from the clothing by circulation of the heating style.

[0004] For example, although it is possible to use a mass thing as a heating heater formed in a circulation air course in order to shorten the drying time, there is an insurance upper limit community in it.

[0005] Moreover, by the circulation wind which is not an elevated temperature so much, the result made into PARITSU is never expectable, and in the phase which progressed to some extent, especially the dehumidification by the heat exchange of the circulation style seldom progresses, but is considered to be the cause which bars the result which also made this PARITSU.

[0006] It is what performed this invention in view of the above-mentioned situation, and shortening of the drying time in a clothes dryer is attained, and it aims at the ability to be made to perform a result of desiccation with PARITSU as good further.

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## MEANS

[Means for Solving the Problem] Invention of this invention according to claim 1 is the clothes dryer which equips the drying room which contains clothing, and its drying room with the circulation air course which circulates the wind for clothing desiccation, and it is taken as the configuration for which it comes to prepare the lamp or heater for drying said clothing while it heats the wind for said desiccation in said drying room.

[0009] According to the above-mentioned configuration, in the style of circulation, in addition, since desiccation of clothing is performed by the exposure heat at a lamp or a heater, while desiccation capacity improves by this and the drying time is shortened, the result condition of the desiccation made into PARITSU is acquired.

[0010] In invention according to claim 1, where a front lid is opened by considering as the configuration (invention according to claim 2) with which a lamp or a heater is attached in the inner surface of the front lid of drying room, since a lamp or a heater is located outside drying room, it can be performed easily, without receipts and payments of the clothing to drying room becoming obstructive [ a lamp or a heater ].

[0011] In invention according to claim 1, drying ability improves further by (invention according to claim 3) being reflected by the inner surface of drying room being considered as a reflector configuration, and exposure light being reflected in the reflector, and attaining to clothing.

[0012] Invention according to claim 4 is a clothes dryer which equips the drying room which contains clothing, and its drying room with the circulation air course which circulates the wind for clothing desiccation, consists of the 1st and the 2nd air course which said circulation air course branches and are arranged at juxtaposition, and is taken as the configuration in which it comes to prepare a desiccant in said 2nd air course.

[0013] According to the above-mentioned configuration, a desiccant is enabled to perform chemical desiccation of the circulation style auxiliary, the dehumidification engine performance depended in the style of circulation by this improves, and the result condition of the desiccation made into PARITSU is acquired.

[0014] Invention according to claim 5 has the configuration of invention of claim 1 and four publications, and doubles and demonstrates claim 1 and the operation effectiveness of invention of four publications.

[0015] In invention according to claim 4 or 5, a desiccant pulls out and always good hygroscopic ability can be given by taking out a desiccant and making it dry by considering as the configuration (invention according to claim 6) which it comes to prepare inside possible [ ejection ].

[0016] In a clothes dryer according to claim 4 or 5, a desiccant can be efficiently used by changing to a 1st air course side in the phase where the dehumidification capacity of the circulation style by (invention according to claim 7) and heat exchange declines, by establishing the 1st and the air course change device in which the change of the 2nd air course is performed, corresponding to the detection humidity of a humidity sensor and its humidity sensor.

[0017]

[Embodiment of the Invention] Drawing 1 shows the longitudinal-section configuration in the condition of having removed the front lid of a clothes dryer, and drawing 2 shows the appearance configuration in the condition of having pulled out the aperture drawer for the front lid.

[0018] As for 1, the desiccation drum 15 as drying room is formed in the interior with the device frame. The desiccation drum 15 is a product made from stainless steel, and makes the inner surface the reflector.

[0019] Moreover, the desiccation drum 15 is attached in a pivot 14 pivotable at the back, and the heat exchange fan 17 is further formed pivotable behind the desiccation drum 15 at the above-mentioned pivot 14. 40 — a motor — it is — belts 20 and 19 — each — minding — the above-mentioned desiccation drum 15 and the heat exchange fan 17 — it is prepared so that it may be alike, respectively and revolution driving force may be given.

[0020] 5 is attached in the device frame 1 free [ closing motion ], in the clothing receipts-and-payments opening 4 of the desiccation drum 15, it is a lid before a wrap, and the transparent and circular view port 37 is formed in the center section, and the infrared lamp 9 is attached in the center of an inner surface in the condition of being covered with the transparence covering 10. This infrared lamp 9 is a heater heated by radiation. 36 is a control panel.

[0021] The desiccation drum 15 equips a tooth-back location with a through-hole, and the tooth-back space of the desiccation drum 15 which is open for free passage in the desiccation drum 15 with the through-hole, i.e., the heat exchange fan's 17 front space, and the lower part before the desiccation drum 15 are connected by the circulation air course 60 which bypasses the desiccation drum 15 to a lower part side. The both-sides section of the circulation air course 60 consists of connection air courses 24 and 25 located perpendicularly, a drain hole 28 is formed in the lower part of a location to which the connection air course 24 of the back is connected, and the humidity sensor 26 is formed in the slant top location.

[0022] And as shown in drawing 3, the parallel arrangement of the part (downstream of the desiccation style) located in a front [ humidity sensor / 26 / of the circulation air course 60 ] side is branched and carried out to the 1st and the 2nd air course 51 and 50. 29 is a solenoid coil, 30 is solenoid agonist, the solenoid agonist 30 is usually the spring force, and as shown in drawing 3, an air hole 53 is closed by operating with closing and a solenoid coil 29 and carrying out the variation rate of the air hole 52.

Thus, the air from a desiccation drum 15 tooth-back side is selectively introduced into the 1st and the 2nd air course 51 and 50 by the air course change device which consists of a solenoid coil 29 and solenoid agonist 30 being established.

[0023] In the 2nd air course 50 of the above, a drawer 32 is formed possible [ receipts and payments ] in the front face of a clothes dryer, the shelf 33 of permeability is formed in the drawer 32 at a dip condition, on the shelf 33, press support of the spring 35 is carried out, and the desiccant 34 of the gestalt with which silica gel, a poly vinyl system water-absorbing resin, etc.

were filled up into the permeability bag etc. is formed.

[0024] Chemical dehumidification of the air drawn in the 2nd air course 50 is carried out by passing through the inside of a desiccant 34 by such configuration. Moreover, a desiccant 34 can be taken out by pulling out and pulling out 32, and it can maintain so that hygroscopic, always high ability can be demonstrated by what is considered as dryness in advance of the activity. Furthermore, since it is not vertical and the desiccant 34 is arranged in the dip condition with the shelf 33, moisture absorption area can be made large and the moisture absorption effectiveness can be heightened in the limited air course tooth space. Both the front end sides of the 1st and the 2nd air course 51 and 50 join the connection air course 25 of anterior part.

[0025] Hereafter, explanation of desiccation actuation is given. Drawing 4 is a flow chart which shows the outline of desiccation actuation.

[0026] First, the desiccant 34 in a drawer 32 is put in in the desiccation drum 15 without ejection and clothing, a start switch is turned on with a control panel 36, and desiccation actuation of a desiccant 34 is performed in advance of clothing desiccation. When a desiccant 34 is beforehand made into dryness and is contained in the drawer 32, this desiccation actuation is not needed.

[0027] While a motor 40 operates by a start switch being turned on, an infrared lamp 9 is turned on. While the air for desiccation circulates through the circulation air course 60 in the desiccation drum 15 which both the desiccation drum 15 and the heat exchange fan 17 rotate, and rotates by this, a circulation wind is heated by the infrared lamp 9.

[0028] Heat exchange of the circulation wind is carried out to the open air which circulates through the heat exchange fan's 17 outside location in the heat exchange fan's 17 front location, dehumidification is performed by condensation operation by being cooled by that cause, and the waterdrop by the dehumidification to produce is discharged from a drain hole 28. And the dried circulation wind is that the solenoid coil 29 is not operating, goes into the 1st path 51 from a through-hole 53, and reaches the connection air course 25 further.

[0029] thus, desiccation of the clothing which was heated in the desiccation drum 15 and which is twisted in the style of circulation is performed — both, further, also by the exposure heat of an infrared lamp 9, desiccation of clothing is performed and, thereby, drying ability higher than the clothes dryer of the conventional chisel of the circulation style is demonstrated. Drying ability is improving further by desiccation being performed by the inner surface of the desiccation drum 15 being especially made into a reflector by the reflected heat from the reflector.

[0030] It may replace with the above-mentioned infrared lamp 9, and a halogen lamp may be used, and various heaters may be used.

[0031] And desiccation operation stops in the phase in which the humidity level detected with a humidity sensor 26 reached the set point. Then, an operator contains a desiccant 34 in ejection and a drawer 32 from the inside of the desiccation drum 15, in the desiccation drum 15, contains clothing and turns on a start switch. Thereby, the same desiccation actuation as the above is performed. The condition of internal clothing can be checked through a view port 37.

[0032] and in the condition from which the detection humidity by the humidity sensor 26 became about 1 law, i.e., the phase where the dehumidification by a certain heat exchange of the circulation style would progress, and desiccation of the clothing which the humidity level of the circulation style becomes fixed, and is twisted in the style of circulation will not progress, a solenoid coil 29 is turned on and the solenoid agonist 30 operates — having — a through-hole 52 — open — he and a through-hole 53 are closed. Thereby, a circulation wind is introduced into the 2nd air course 50 side, and chemical dehumidification according [ a circulation wind ] to a desiccant 34 is performed. Desiccation of clothing progresses further more in the style of circulation, and desiccation actuation is suspended in the condition that the humidity corresponding to 95% of dryness factors in this 1st air course 50 was detected by the humidity sensor 26.

[0033] According to the above-mentioned desiccation actuation, first, since direct clothing is dried with the exposure heat of an infrared lamp 9, the desiccation result condition which the drying time was shortened and was made into PARITSU is acquired. Furthermore, the desiccation result condition made into PARITSU is further acquired by using dehumidification by the desiccant 34 auxiliary.

[0034] In the above-mentioned operation gestalt, although the circulation wind considered as the configuration heated only with an infrared lamp 9, the heating is good also as a configuration which forms a heater in a circulation air course like before as an auxiliary thing.

[0035] Moreover, although the graphic display is omitted, a clothes dryer is equipped with the control section which consists of a microcomputer, the signal from a control panel 36 and humidity sensor 26 grade is given to the control section, and a control section gives an operating-command signal to a motor 60 and halogen lamp 9 grade based on the program set up corresponding to these signals.

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DESCRIPTION OF DRAWINGS  
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## [Brief Description of the Drawings]

[Drawing 1] The longitudinal-section block diagram in the condition of having removed the front lid of the clothes dryer of this invention

[Drawing 2] Appearance configuration strabism in the condition of having pulled out the aperture drawer for the front lid of the clothes dryer of this invention

[Drawing 3] The horizontal sectional view showing the branching configuration of a circulation air course part

[Drawing 4] The flow chart which shows an outline for desiccation actuation

## [Description of Notations]

5 Front Lid

9 Infrared Lamp

15 Desiccation Drum (Drying Room)

29 Solenoid Coil (Air Course Change Device)

30 Solenoid Agonist (Air Course Change Device)

32 Drawer

34 Desiccant

50 2nd Air Course

51 1st Air Course

60 Circulation Air Course

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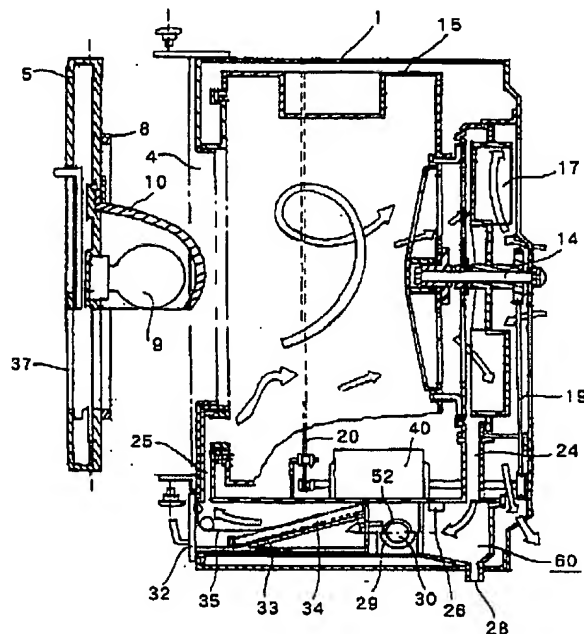
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(54) 【発明の名称】 衣類乾燥機

(57) 【要約】

【課題】 衣類乾燥機における乾燥時間の短縮化を図り、さらには、乾燥の仕上がりをバリッと良好とできるようにする。

【解決手段】 衣類を収納する乾燥室15と、その乾燥室15に衣類乾燥用の風を循環させる循環風路60とを備える衣類乾燥機であり、乾燥室15内に乾燥用の風を加熱するとともに、衣類を乾燥させるためのランプまたはヒータ9が備えられ、かつ、循環風路60が分岐されて並列に配置される第1と第2との風路51、50とからなり、第2の風路50に吸湿剤34が設けられてなるもの。



## 【特許請求の範囲】

【請求項1】 衣類を収納する乾燥室と、その乾燥室に衣類乾燥用の風を循環させる循環風路とを備える衣類乾燥機であり、前記乾燥室内に前記乾燥用の風を加熱するとともに、前記衣類を乾燥させるためのランプまたはヒータが備えられてなることを特徴とする衣類乾燥機。

【請求項2】 前記ランプまたはヒータが、前記乾燥室の前蓋の内面に取り付けられてなることを特徴とする請求項1記載の衣類乾燥機。

【請求項3】 前記乾燥室の内面が反射面構成とされてなることを特徴とする請求項1記載の衣類乾燥機。

【請求項4】 衣類を収納する乾燥室と、その乾燥室に衣類乾燥用の風を循環させる循環風路とを備える衣類乾燥機であり、前記循環風路が分岐されて並列に配置される第1と第2との風路とからなり、前記第2の風路に吸湿剤が設けられてなることを特徴とする衣類乾燥機。

【請求項5】 衣類を収納する乾燥室と、その乾燥室に衣類乾燥用の風を循環させる循環風路とを備える衣類乾燥機であり、前記乾燥室内に前記乾燥用の風を加熱するとともに、前記衣類を乾燥させるためのランプまたはヒータが備えられ、かつ、前記循環風路が分岐されて並列に配置される第1と第2との風路とからなり、前記第2の風路に吸湿剤が設けられてなることを特徴とする衣類乾燥機。

【請求項6】 前記吸湿剤が引き出し内に取り出し可能に設けられてなる請求項4または5記載の衣類乾燥機。

【請求項7】 請求項4または5記載の衣類乾燥機において、湿度センサと、その湿度センサの検出湿度に対応して前記第1と第2との風路の切り替えを行う風路切り替え機構とが設けられてなることを特徴とする衣類乾燥機。

## 【発明の詳細な説明】

【0001】

【発明の属する技術分野】この発明は衣類乾燥機の乾燥動作の改良に関する。

【0002】

【従来の技術】衣類乾燥機では、回転ドラム等よりなる乾燥室内に加熱風を導入し、その加熱風に衣類の水分を吸収させ、その水分を吸収した加熱風を外部から導入した空気と熱交換して冷却し、冷却に伴う凝縮作用により水分を除去させてこれを排出し、水分の除去された空気を再び加熱して乾燥室内送り込んで衣類の乾燥を行っている。

【0003】

【発明が解決しようとする課題】しかしながら、現状の衣類乾燥機では、乾燥時間が長くなる、乾燥の仕上がり状態がバリツとならないという基本的な問題があり、この問題はとくに大容量の衣類乾燥機において顕著なものとなる。上記問題は、乾燥を加熱風の循環による衣類からの除湿のみによって行っていることに起因すると考

えられる。

【0004】例えば、乾燥時間を短縮するには、循環風路に設ける加熱ヒータとして大容量のものをを用いることが考えられるが、それには安全上限界がある。

【0005】また、それほど高温でない循環風ではどうしてもバリツとした仕上がり期待できず、とくに、循環風の熱交換による除湿はある程度進んだ段階ではあまり進まず、これもバリツとした仕上りを妨げる原因と考えられる。

【0006】この発明は上記の事情に鑑みて行ったもので、衣類乾燥機における乾燥時間の短縮化を図り、さらには、乾燥の仕上りをバリツと良好とできるようにすることを目的とする。

【0007】また、乾燥性能に優れる大容量の衣類乾燥機を提供することを目的とする。

【0008】

【課題を解決するための手段】この発明の請求項1記載の発明は、衣類を収納する乾燥室と、その乾燥室に衣類乾燥用の風を循環させる循環風路とを備える衣類乾燥機で、前記乾燥室内に前記乾燥用の風を加熱するとともに、前記衣類を乾燥させるためのランプまたはヒータが備えられてなる構成とする。

【0009】上記構成によれば、循環風に加え、ランプまたはヒータによる照射熱によっても衣類の乾燥が行われるので、これにより乾燥能力が向上されて、乾燥時間が短縮されるとともに、バリツとした乾燥の仕上がり状態が得られる。

【0010】請求項1記載の発明において、ランプまたはヒータが乾燥室の前蓋の内面に取り付けられる構成（請求項2記載の発明）とされることで、前蓋を開いた状態ではランプまたはヒータは乾燥室外に位置するので、乾燥室への衣類の出し入れがランプまたはヒータが邪魔となること無く容易に行える。

【0011】請求項1記載の発明において、乾燥室の内面が反射面構成とされることで（請求項3記載の発明）、その反射面で照射光が反射されて衣類に及ぶことで、さらに乾燥性能が向上される。

【0012】請求項4記載の発明は、衣類を収納する乾燥室と、その乾燥室に衣類乾燥用の風を循環させる循環風路とを備える衣類乾燥機であり、前記循環風路が分岐されて並列に配置される第1と第2との風路とからなり、前記第2の風路に吸湿剤が設けられてなる構成とする。

【0013】上記構成によれば、吸湿剤によって循環風のケミカル乾燥が補助的に行われることが可能となり、これにより循環風による除湿性能が向上されて、バリツとした乾燥の仕上がり状態が得られる。

【0014】請求項5記載の発明は、請求項1、4記載の発明の構成を合わせ持ち、請求項1、4記載の発明の作用効果を合わせ発揮するものである。

【0015】請求項4または5記載の発明において、吸湿剤が引き出し内に取り出し可能に設けられてなる構成（請求項6記載の発明）とされることで、吸湿剤を取り出して乾燥させることで、常に良好な吸湿性能を付与できる。

【0016】請求項4または5記載の衣類乾燥機において、湿度センサと、その湿度センサの検出湿度に対応して第1と第2との風路の切り替えを行う風路切り替え機構とを設けることで（請求項7記載の発明）、熱交換による循環風の除湿能力が低下する段階において、第1の風路側に切り替えることで吸湿剤を効率良く使用できる。

【0017】

【発明の実施の形態】図1は衣類乾燥機の前蓋を外した状態の縦断面構成を示し、図2は前蓋を開き引き出しを引き出した状態の外観構成を示す。

【0018】1は機器フレームでその内部には乾燥室としての乾燥ドラム15が設けられている。乾燥ドラム15はステンレス製で、その内面を反射面としている。

【0019】また、乾燥ドラム15はその後部において支軸14に回転可能に取り付けられ、さらに、その乾燥ドラム15の後方には、熱交換ファン17が上記支軸14に回転可能に設けられている。40はモータで、ベルト20、19それぞれを介して上記乾燥ドラム15、熱交換ファン17それぞれに回転駆動力を与えるように設けられている。

【0020】5は機器フレーム1に開閉自在に取り付けられ、乾燥ドラム15の衣類出し入れ口4を覆う前蓋であり、その中央部には透明で円形であるのぞき窓37が設けられ、内面の中央には透明カバー10で覆われる状態で赤外線ランプ9が取り付けられている。この赤外線ランプ9は輻射により加熱する加熱器である。36は操作パネルである。

【0021】乾燥ドラム15は背面位置に通孔を備え、その通孔により乾燥ドラム15内と連通する乾燥ドラム15の背面空間、すなわち、熱交換ファン17の前面空間と、乾燥ドラム15の前下部とは乾燥ドラム15を下方側において迂回する循環風路60により接続されている。循環風路60の両側部は垂直方向に位置する接続風路24、25からなり、その後部の接続風路24の接続される位置の下部には排水孔28が設けられ、その斜め上位置には湿度センサ26が設けられている。

【0022】そして、循環風路60の湿度センサ26より前側に位置する部分（乾燥風の下流側）は、図3に示すように、第1と第2の風路51、50とに分岐されて並列配置されている。29はソレノイドコイル、30はソレノイド作動体で、ソレノイド作動体30は通常はバネ力で、図3に示すように、通気孔52を閉じ、ソレノイドコイル29により作動されて変位されることで通気孔53を閉じるようになっている。このように、ソレノ

イドコイル29、ソレノイド作動体30よりなる風路切り替え機構が設けられることで、乾燥ドラム15背面側からの空気は第1と第2との風路51、50に選択的に導入されるようになっている。

【0023】上記第2の風路50内には、引き出し32が衣類乾燥機の前面において出し入れ可能に設けられ、その引き出し32内には傾斜状態に通気性の棚33が設けられ、その棚33上にはシリカゲルやポリビニール系高吸水性樹脂等が通気性袋等に充填された形態の吸湿剤34が、バネ35が押圧支持されて設けられている。

【0024】このような構成により、第2の風路50内に導かれた空気は吸湿剤34内を通過することでケミカル除湿されるようになっている。また、吸湿剤34は引き出し32を引き出すことで取り出せ、使用に先だって乾燥状態としておくことで常に高い吸湿性能を発揮できるように維持できる。さらに、棚33により吸湿剤34を垂直ではなく傾斜状態に配置しているため、吸湿面積を広くでき、限られた風路スペースの中で吸湿効果を高めることができる。第1と第2の風路51、50の前端側は、ともに前部の接続風路25に合流する。

【0025】以下、乾燥動作の説明を行う。図4は乾燥動作の概略を示すフローチャートである。

【0026】まず、引き出し32内の吸湿剤34を取り出し、衣類の無い乾燥ドラム15内に入れ、操作パネル36でスタートスイッチをONし、衣類乾燥に先だって吸湿剤34の乾燥動作を行う。吸湿剤34があらかじめ乾燥状態とされ引き出し32内に収納されている場合は、この乾燥動作は必要としない。

【0027】スタートスイッチがONされることでモータ40が作動されるとともに、赤外線ランプ9が点灯される。これにより、乾燥ドラム15、熱交換ファン17がともに回転され、回転する乾燥ドラム15内に乾燥用の空気が循環風路60を介して循環されるとともに、循環風は赤外線ランプ9により加熱される。

【0028】その循環風は熱交換ファン17の前面位置において熱交換ファン17の外周位置を循環される外気と熱交換され、それにより冷却されることで凝縮作用により除湿が行われ、その除湿による生じる水滴は排水孔28から排出される。そして、乾燥された循環風はソレノイドコイル29が作動されていないことで、通孔53から第1の通路51に入り、さらに接続風路25に至る。

【0029】このようにして、乾燥ドラム15内において加熱された循環風による衣類の乾燥が行われるとともに、さらに、赤外線ランプ9の照射熱によっても衣類の乾燥が行われ、これにより従来の循環風のみでの衣類乾燥機より高い乾燥性能が発揮される。とくに、乾燥ドラム15の内面が反射面とされていることで、その反射面からの反射熱によっても乾燥が行われることで、さらに乾燥性能が向上されている。

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【0030】上記赤外線ランプ9に代えてハロゲンランプを用いてもよく、また、各種ヒータを用いてもよい。

【0031】そして、湿度センサ26で検出される湿度レベルが設定値に達した段階で乾燥運転は停止される。そこで作業者は乾燥ドラム15内から吸湿剤34を取り出し、引き出し32内に収納し、乾燥ドラム15内に衣類を収納してスタートスイッチをONする。これにより上記と同様の乾燥動作が行われる。内部の衣類の状態はのぞき窓37を通して確認できる。

【0032】そして、湿度センサ26による検出湿度がほぼ一定となった状態、すなわち、ある循環風の熱交換による除湿が進み循環風の湿度レベルが一定となって循環風による衣類の乾燥が進まなくなった段階において、ソレノイドコイル29がONされ、ソレノイド作動体30が作動されて通孔52が開かれ、通孔53が閉じられる。これにより第2の風路50側に循環風は導入され、循環風は吸湿剤34によるケミカル除湿が行われる。この第1の風路50での循環風により衣類の乾燥がさらに進み、湿度センサ26により乾燥率95%に対応する湿度が検知された状態において乾燥動作が停止される。

【0033】上記乾燥動作によれば、まず、赤外線ランプ9の照射熱により直接衣類を乾燥するので、乾燥時間が短縮され、かつ、バリッとした乾燥仕上がり状態が得られる。さらに、吸湿剤34による除湿を補助的に使うことにより、さらに、バリッとした乾燥仕上がり状態が得られる。

【0034】上記の実施形態においては、循環風は赤外線ランプ9のみにより加熱する構成としたが、その加熱は補助的なものとして従来のように循環風路にヒータを設ける構成としてもよい。

【0035】また、図示は省略しているが、衣類乾燥機

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はマイクロコンピュータよりなる制御部を備え、その制御部に操作パネル36、湿度センサ26等からの信号が与えられ、制御部はそれら信号に対応して設定されたプログラムに基づきモータ60、ハロゲンランプ9等に動作指令信号を与えるようになっている。

【0036】

【発明の効果】この発明によれば、衣類乾燥機において乾燥時間の短縮化が可能となり、さらに、乾燥の仕上がりをバリッと良好とできるようにすることが可能となる。

【0037】とくに、乾燥性能に優れる大容量の衣類乾燥機を提供できるようになる。

【図面の簡単な説明】

【図1】この発明の衣類乾燥機の前蓋を外した状態の縦断面構成図

【図2】この発明の衣類乾燥機の前蓋を開き引き出しを引き出した状態の外観構成斜視

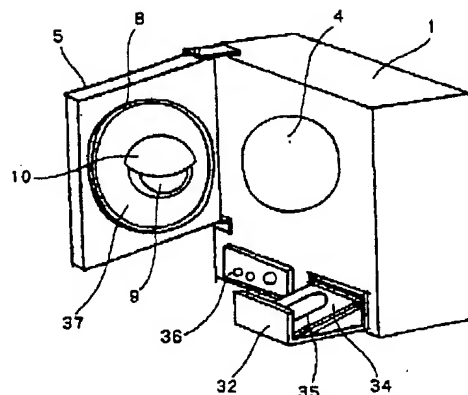
【図3】循環風路部分の分岐構成を示す水平断面図

【図4】乾燥動作を概略を示すフローチャート

【符号の説明】

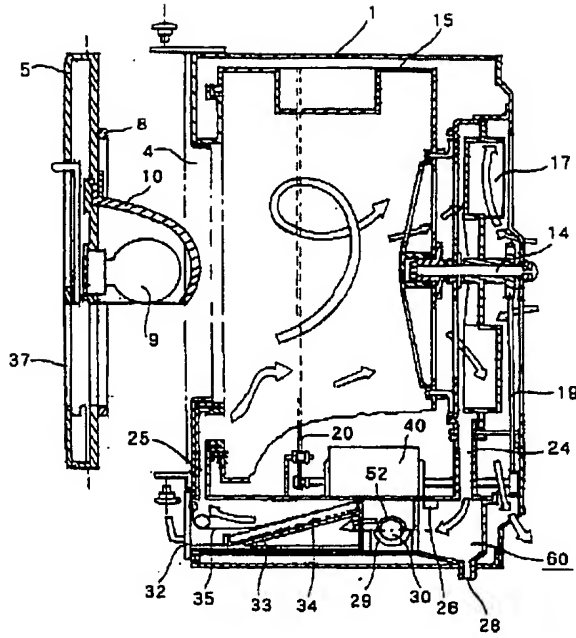
- 5 前蓋
- 9 赤外線ランプ
- 15 乾燥ドラム（乾燥室）
- 29 ソレノイドコイル（風路切り替え機構）
- 30 ソレノイド作動体（風路切り替え機構）
- 32 引き出し
- 34 吸湿剤
- 50 第2の風路
- 51 第1の風路
- 60 循環風路

【図2】

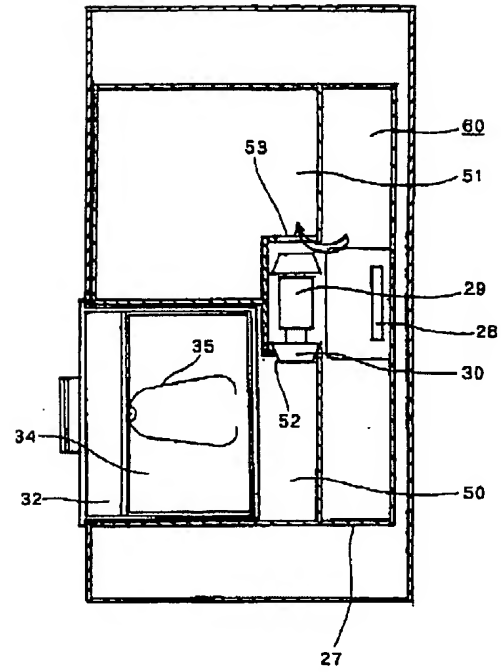




【図1】



【図3】



【図 4】

